

# Effect of irradiation and annealing performed with bias voltage applied across the coupling capacitors on the interstrip resistance of ATLAS ITk silicon strip sensors

- 4 ATLAS17LS miniature sensors developed by the ATLAS ITk strip collaboration were gamma irradiated by  $^{60}\text{Co}$  source to the TID of 57.2 Mrad - samples W213 and W214 were irradiated with  $V_{\text{bias}} = 0.5 \text{ V}$  applied across their coupling capacitors.
- All irradiated samples were annealed for 80 minutes at  $+60^\circ\text{C}$ , with the  $V_{\text{bias}} = 0.5 \text{ V}$  applied across the coupling capacitors of roughly half of the strips of samples W213 and W214 during the annealing process.
- Measured data indicates that  $R_{\text{int}}$  values of samples irradiated with  $V_{\text{bias}}$  applied over the coupling capacitors are reduced by 25% compared with samples irradiated without  $V_{\text{bias}}$ .
- Application of  $V_{\text{bias}}$  during the annealing process seems to compensate this effect - the ratio between averaged  $R_{\text{int}}$  value measured for sensor W213 (W214) and the averaged  $R_{\text{int}}$  obtained for W215 and W219 with no wire bonds is 0.90 (1.07) and 0.62 (0.87) for strips annealed with and without the  $V_{\text{bias}}$  applied across the coupling capacitors, respectively.
- The presented findings confirm our planning and viability of the sensor technology for the ATLAS ITk strip program.

